

IN THE CLAIMS

1. (currently amended): A gas burner having low emissions of polluting agents ~~[[1]]~~ comprising a main metal body ~~[[6]]~~ open at a first base end, having a housing for a gas distributor at a second base end wherein said housing has a volume inside thereof and an internal lining of a coating of refractory material, an inner central lance ~~(11)~~ for combustible gas arranged inside said main metal body, at least two outer side lances ~~(10)~~ for combustible gas associated with said main metal body, a single duct ~~[[8]]~~ for the adduction introduction of pre-heated air where said single duct is connected to a side surface of said main metal body, a gas regulation system for the combustible gas, a refractory unit ~~(30)~~ associated with said first base end, characterized in that said gas burner ~~[[1]]~~ comprises a series of nozzles ~~(20)~~ situated in said refractory unit for the injection of the pre-heated air into the a combustion chamber of an oven, said series of nozzles being in communication with a plenum defined by the volume inside said housing that is internally lined with a coating of refractory material and is located between the inner central lance and the outer side lances and in that, by operating on the said gas regulation system comprises means for varying the distribution percentage of the combustible gas between the inner central lance and the outer side lances thereby, it is possible to continuously switching from a flame functioning mode of the burner, wherein the combustible gas is injected to said combustion chamber through said inner central lance alone, to a flameless functioning mode, wherein the combustible gas is injected to said inner central lance alone the latter characterized by low emissions of polluting agents.

2. (currently amended): The gas burner ~~[[1]]~~ according to claim 1, characterized in that said refractory unit

~~(30)~~ comprises a first region ~~(31)~~, a second region ~~(32)~~, a third region ~~(33)~~, which are concentric, said first region in turn comprising a series of calibrated holes ~~(16)~~ and a central hole, having an inner surface from which the gas flows out and which houses a tip portion of said inner central lance where said tip portion has an external diameter, and preferably a free annular crown ~~(119)~~ being defined between the inner surface of said central hole and the external diameter of said tip portion of the inner central lance, ~~the latter for said free annular crown being in communication with said plenum thereby~~ allowing the passage of a sufficient quantity of pre-heated air suitable for preventing the overheating of the inner central lance ~~(11)~~.

3. (currently amended): The gas burner ~~[[(1)]]~~ according to claim 2, characterized in that said series of nozzles ~~(20)~~ for the air is housed in the second region ~~(32)~~.

4. (currently amended): The gas burner ~~[[(1)]]~~ according to claim 2, characterized in that said series of nozzles ~~(20)~~ comprises ten nozzles, and in that said series of calibrated holes ~~(16)~~ comprises three calibrated holes.

5. (currently amended): The gas burner ~~[[(1)]]~~ according to claim 2, characterized in that said first region comprises a cavity ~~(34)~~ communicating with the combustion chamber and into which the air from the series of calibrated holes flows together with the combustible gas injected through the inner central lance ~~(11)~~.

6. (currently amended): The gas burner ~~[[(1)]]~~ according to claim 2, characterized in that the first region ~~(31)~~ houses a flame detector in the housing ~~(10)~~ and the ignition device situated in the housing ~~(17)~~ of the burner ~~[[(1)]]~~.

7.(currently amended): The gas burner ~~[[1]]~~ according to claim 3, characterized in that the holes of said series of calibrated holes ~~(16)~~ are at an equal distance along a coaxial circumference with the inner central lance ~~(11)~~ and lying on the bottom of the cavity ~~(34)~~ of the first region ~~(31)~~.

8.(currently amended): The gas burner ~~[[1]]~~ according to claim 1, characterized in that the nozzles of said series of nozzles ~~(20)~~ are situated at an equal distance along a coaxial circumference with the inner central lance ~~(11)~~ and lying on a base surface of the second region ~~(32)~~.

9. (currently amended): The gas burner according to claim 1, characterized in that said burner ~~[[1]]~~ comprises at least two pass-through holes ~~(21)~~ for housing said at least two outer side lances ~~(10)~~.

10.(currently amended): The gas burner ~~[[1]]~~ according to claim 2, characterized in that said at least two pass-through holes ~~(21)~~ are situated at an equal distance along a coaxial circumference with the inner central lance ~~(11)~~ and lying on a base surface of the third region ~~(33)~~.

11.(currently amended): The gas burner ~~[[1]]~~ according to claim 3, characterized in that said the total outflow section of air from the series of calibrated holes ~~(16)~~ with respect to the total outflow section of air from the series of nozzles ~~(20)~~ has a ratio ranging from 0.01 to 0.9.

12.(currently amended): The gas burner ~~[[1]]~~ according to claim 11, characterized in that the total outflow section of air from the series of calibrated holes (16) with respect to the total outflow section of air from the

series of nozzles ~~(20)~~ has a ratio ranging from 0.05 to 0.5.

13.(currently amended): The gas burner ~~[[1]]~~ according to claim 3, characterized in that once a ratio (x) has been defined, equal to the distance between the barycentre of a first hole of the series of calibrated holes ~~(16)~~ and the barycentre of a second hole of the series of calibrated holes ~~(16)~~, divided by a minimum diameter selected from a hydraulic diameter of the first hole and a hydraulic diameter of the second hole, said ratio (x) is at least equal to 1.

14.(currently amended): The gas burner ~~[[1]]~~ according to claim 13, characterized in that said ratio (x) is at least equal to 2.

15.(currently amended): The gas burner ~~[[1]]~~ according to claim 1, characterized in that once a ratio (y) has been defined, equal to the distance between the barycentre of a first nozzle of the series of nozzles ~~(20)~~ and the barycentre of a second nozzle of the series of nozzles ~~(20)~~, divided by a minimum diameter selected from an internal hydraulic diameter of the first nozzle and an internal hydraulic diameter of the second nozzle, said ratio (y) ranges from 1 to 10.

16.(currently amended): The gas burner ~~[[1]]~~ according to claim 15, characterized in that said ratio (y) ranges from 2 to 5.

17.(currently amended): The gas burner ~~[[1]]~~ according to claim ~~[[2]]~~ 9, characterized in that once a ratio (z) has been defined, equal to the distance between the barycentre of a hole of said at least two holes ~~(21)~~ and the barycentre of a nozzle of said series of nozzles ~~(20)~~, divided by a minimum diameter selected from a

hydraulic diameter of the hole and an internal hydraulic diameter of the nozzle, said ratio (z) ranges from 1 to 50.

18. (currently amended): The gas burner ~~[[1]]~~ according to claim 17, characterized in that said ratio (z) ranges from 3 to 30.

19. (currently amended): The gas burner ~~[[1]]~~ according to claim 5, characterized in that said cavity ~~(34)~~ has an outer diameter (Da2), an internal diameter (Dal) and a depth (Lal), once a ratio (s) has been defined between the depth (Lal) of the cavity ~~(34)~~ and the internal diameter (Dal) of the same, said ratio (s) ranges from 0 to 5.

20. (currently amended): The gas burner ~~[[1]]~~ according to claim 19, characterized in that the outer diameter (Da2) of said cavity ~~(34)~~ is greater than the internal diameter (Dal) of the same.

21. (currently amended): The gas burner ~~[[1]]~~ according to claim 19, characterized in that said ratio (s) ranges from 0 to 1.5.

22. (currently amended): The gas burner ~~[[1]]~~ according to claim 1, characterized in that said main metal body ~~[[6]]~~ further ~~comprises an internal coating (4) made of a refractory material and an insulator [[3]] made of fiber.~~

23. (currently amended): The gas burner ~~[[1]]~~ according to claim 1, characterized in that ~~it~~ said burner comprises at least two side protections ~~[[7]]~~ for said at least two outer side lances ~~(10)~~ for the combustible gas.

24. (currently amended): The gas burner ~~[[1]]~~ according to claim 1, characterized in that said protections ~~[[7]]~~ are applied to the main metal body ~~[[6]]~~.

25. (currently amended): The gas burner ~~[[1]]~~ according to claim 1, characterized in that ~~it~~ said burner comprises a perforated flange ~~[[5]]~~ for supporting said at least two outer side lances ~~+10+~~.

26. (currently amended): The gas burner ~~[[1]]~~ according to claim ~~[[1]]~~ 2, characterized in that said ~~burner comprises a~~ central hole ~~+19+~~ has having a hydraulic diameter, said central inner lance ~~[[11]]~~ having an outer diameter, having defined a ratio (k) between the hydraulic diameter of ~~the~~ said central hole ~~[[19]]~~ and the outer diameter of the lance (11), said ratio (k) ranges from 0.3 to 3.

27. (original): The gas burner according to claim 26, characterized in that said ratio (k) ranges from 0.5 to 1.5.

28. (currently amended): The gas burner according to claim 8, characterized in that the base surface of the second region ~~+32+~~ and the base surface of the third region ~~+33+~~ of the refractory unit ~~+30+~~ are level and aligned.

29. (currently amended): The gas burner according to claim 28, characterized in that the base surface of the second region ~~+32+~~ and the base surface of the third region ~~+33+~~ of the refractory unit ~~+30+~~ are aligned with an internal wall ~~+70+~~ of the oven.